BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Subsidiary Diploma in Applied Science Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Biomedical Science Pearson BTEC International Level 3 Diploma in Environmental Science Pearson BTEC International Level 3 Extended Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Biomedical Science Pearson BTEC International Level 3 Extended Diploma in Environmental Science
Unit number and title	**Unit 14: Genetics and Genetic engineering**
Learning aim(s) (For NQF only)	**B**: Explore how the process of cell division in eukaryotic cells contributes to genetic variation
Assignment title	**Cell division**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are a trainee lab technician supporting the Histology Department in a medical laboratory. As part of your induction, you have been asked to demonstrate how to set up a microscope, prepare microscope slides to observe and draw the stages of mitosis and meiosis. You must prepare a report which includes evidence of your practical work, and discusses and explains the structure, function and behaviour of the chromosomes during cell division and evaluates how this leads to variation.

Task 1	Demonstrate how to set up a microscope and **skilfully prepare microscope slides** in order to observe and draw stages in mitosis and meiosis. **Explain** the structure and function of chromosomes and **discuss** and **evaluate** how their behaviour during mitosis and meiosis leads to variation. **Skilfully** and **independently prepare:** • three microscope slides to observe a minimum of four stages of mitosis e.g. root tip squash • three microscope slides to observe a minimum of four

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	stages of meiosis e.g. lily anther squash **Demonstrate** the ability to apply a stain/fixer (if required), squash the specimen, and apply a cover slip to exclude air from the prepared slides. **Safely** and **independently** handle and set up a light microscope. **Manoeuvre** the slide(s) under different magnifications to obtain a field of view of the material that you have prepared. Your assessor/tutor will validate your level of expertise by completing an observation record. **Demonstrate** good practice to produce biological drawings of your specimens that: • each includes a title • are drawn in pencil • have clear outlines (not sketched) • have no heavy shading • gives the magnification used A minimum of **four stages of mitosis** and **four stages of meiosis** must be drawn. It may be possible to view all four stages of mitosis/meiosis on one slide. In this case only one diagram for mitosis and one for meiosis, showing the minimum number of stages is required. Accurately label and identify the stages in your biological drawings. Remember to include your drawings and tutor/assessor observation record in your report. **Explain** in detail how and why the structure of the human chromosome relates to the function. Your explanations must include: • centromere • chromatids • autosomes • sex chromosomes • chromosome number • homologous • non-homologous chromosomes Using the information from your practical work and referenced supplementary material from secondary sources, **discuss** the behaviour of the chromosomes during mitosis and meiosis in each stage of cell division, including the similarities and differences between plant and animal cells. Ensure you cover: • Mitosis - interphase, prophase, metaphase, anaphase, telophase

	• Meiosis - interphase, prophase I, metaphase I, anaphase I, telophase I, cytokinesis, interkinesis, prophase II, metaphase II, anaphase II, telophase II, cytokinesis • The role of centrioles in cell division • Cell division in haploids and diploids **Evaluate** the significance of chromosomal behaviour during cell division. Provide justified arguments for and against the behaviour of independent assortment and crossing over leading to variation within an organism.
Checklist of evidence required	A report that includes: • observation records showing how you worked safely and skilfully to prepare and observe the stages of cell division under a microscope • microscope drawings (demonstrating skilful technique) of observations from your prepared slides of mitosis and meiosis • explanation of the structure and function of human chromosomes • discussion and evaluation of the behaviour of chromosomes and how this leads to variation.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
B.D2	Evaluate how the behaviour of the chromosomes leads to variation.
B.M2	Demonstrate skilful preparation of microscopic slides to observe and draw the stages of mitosis and meiosis.
B.M3	Discuss the behaviour of the chromosomes during the cell cycle stages of mitosis and meiosis.
B. P2	Prepare microscopic slides to observe and draw the stages of mitosis and meiosis.
B.P3	Explain the structure and function of human chromosomes.

Sources of information to support you with this Assignment	http://www.nuffieldfoundation.org/practical-biology/preparing-anther-squash http://www.nuffieldfoundation.org/practical-biology/investigating-mitosis-allium-root-tip-squash http://vlab.amrita.edu/?sub=3&brch=188&sim=1102&cnt=2 http://www.cellsalive.com/mitosis.htm

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	http://biology.about.com/od/meiosis/ss/meiosisstep.htm http://sammonssci.weebly.com/uploads/3/7/7/0/37708101/03_magnification_and_scale_problems.pdf http://www.microscopy-uk.org.uk/mag/indexmag.html?http://www.microscopy-uk.org.uk/mag/artdec06/yl-squash.html Above are some examples of websites. Further useful resources may be found at: http://qualifications.pearson.com/en/support/published-resources.html#step1